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SCANNING CLOUD RADAR OBSERVATIONS AT AZORES: PRELIMINARY 3D CLOUD PRODUCTS

P. Kollias, I. Jo, A. Tatarevic, and S. Giangrande, McGill University
K. Johnson, Brookhaven National Laboratory
K. Widener and N. Bharadwaj, Pacific Northwest National Laboratory
J. Mead, ProSensing Inc.

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Brookhaven National Laboratory
P.O. Box, Upton, NY
www.bnl.gov

ABSTRACT

The deployment of the Scanning W-Band ARM Cloud Radar (SWACR) during the AMF campaign at Azores signals the first deployment of an ARM Facility-owned scanning cloud radar and offers a prelude for the type of 3D cloud observations that ARM will have the capability to provide at all the ARM Climate Research Facility sites by the end of 2010. The primary objective of the deployment of Scanning ARM Cloud Radars (SACRs) at the ARM Facility sites is to map continuously (operationally) the 3D structure of clouds and shallow precipitation and to provide 3D microphysical and dynamical retrievals for cloud life cycle and cloud-scale process studies. This is a challenging task, never attempted before, and requires significant research and development efforts in order to understand the radar's capabilities and limitations. At the same time, we need to look beyond the radar meteorology aspects of the challenge and ensure that the hardware and software capabilities of the new systems are utilized for the development of 3D data products that address the scientific needs of the new Atmospheric System Research (ASR) program. The SWACR observations at Azores provide a first look at such observations and the challenges associated with their analysis and interpretation. The set of scan strategies applied during the SWACR deployment and their merit is discussed. The scan strategies were adjusted for the detection of marine stratocumulus and shallow cumulus that were frequently observed at the Azores deployment. Quality control procedures for the radar reflectivity and Doppler products are presented. Finally, preliminary 3D-Active Remote Sensing of Cloud Locations (3D-ARSCL) products on a regular grid will be presented, and the challenges associated with their development discussed. In addition to data from the Azores deployment, limited data from the follow-up deployment of the SWACR at the ARM SGP site will be presented. This effort provides a blueprint for the effort required for the development of 3D cloud products from all new SACRs that the program will deploy at all fixed and mobile sites by the end of 2010.

This poster will be displayed at ASR Science Team Meeting.